

Mantenimiento y Pruebas del Software

Laboratorio 7: Pruebas de carga

Grupo F

Smoke test

```
THRESHOLDS

http_req_duration
✓ 'avg<500' avg=1.45ms

http_req_failed
✓ 'rate==0' rate=0.00%

TOTAL RESULTS

checks_total.....: 181307 3021.602259/s
checks_succeeded.....: 100.00% 181307 out of 181307
checks_failed.....: 0.00% 0 out of 181307

✓ response code was 200

HTTP
http_req_duration.....: avg=1.45ms min=0s med=1.19ms max=703.82ms p(90)=2.18ms p(95)=3ms
{ expected response:true }.....: avg=1.45ms min=0s med=1.19ms max=703.82ms p(90)=2.18ms p(95)=3ms
http_req_failed.....: 0.00% 0 out of 181307
http_reqs.....: 181307 3021.602259/s

EXECUTION
iteration_duration.....: avg=1.64ms min=0s med=1.25ms max=736.44ms p(90)=2.44ms p(95)=3.33ms
iterations.....: 181307 3021.602259/s
vus.....: 5 min=5 max=5
vus_max.....: 5 min=5 max=5

NETWORK
data_received.....: 51 MB 856 kB/s
data_sent.....: 14 MB 236 kB/s

running (1m00.0s), 0/5 VUs, 181307 complete and 0 interrupted iterations
default ✓ [=====] 5 VUs 1m0s
```

El smoke test se ha ejecutado correctamente: todas las respuestas han sido positivas, no ha habido peticiones fallidas y la duración media de las peticiones ha sido inferior a 500ms. Por tanto, el sistema supera esta prueba básica de funcionamiento.

Breakpoint test

```
THRESHOLDS

http_req_failed
✓ 'rate<=0.01' rate=0.10%

TOTAL RESULTS

HTTP
http_req_duration.....: avg=110.44ms min=0s med=25.68ms max=7.06s p(90)=316.62ms p(95)=495.98ms
{ expected_response:true }.....: avg=110.56ms min=0s med=25.79ms max=7.06s p(90)=316.75ms p(95)=496.36ms
http_req_failed.....: 0.10% 1324 out of 1295817
http_reqs.....: 1295817 2159.546491/s

EXECUTION
dropped_iterations.....: 1235620 2059.225056/s
iteration_duration.....: avg=161.15ms min=0s med=40.07ms max=54.19s p(90)=452.63ms p(95)=654.58ms
iterations.....: 1295817 2159.546491/s
vus.....: 11 min=1 max=2068
vus_max.....: 2076 min=1000 max=2076

NETWORK
data_received.....: 367 MB 611 kB/s
data_sent.....: 101 MB 168 kB/s

running (10m00.0s), 0000000/0002076 VUs, 1295817 complete and 0 interrupted iterations
breakpoint ✓ [=====] 0000000/0002076 VUs 10m0s 029048.66 iters/s
```

```
THRESHOLDS

http_req_failed
X 'rate<=0.01' rate=2.25%

TOTAL RESULTS

HTTP
http_req_duration.....: avg=2.36s min=0s med=785.7ms max=1m9s p(90)=5.05s p(95)=15.63s
{ expected_response:true }.....: avg=2.41s min=0s med=814.3ms max=59.88s p(90)=5.79s p(95)=16.19s
http_req_failed.....: 2.25% 6445 out of 285373
http_reqs.....: 285373 473.115895/s

EXECUTION
iteration_duration.....: avg=3.89s min=866.9µs med=2.11s max=1m0s p(90)=11.24s p(95)=18.93s
iterations.....: 280474 464.993911/s
vus.....: 13738 min=0 max=13738
vus_max.....: 100000 min=4665 max=100000

NETWORK
data_received.....: 81 MB 135 kB/s
data_sent.....: 22 MB 37 kB/s

running (10m05.5s), 000000/100000 VUs, 280473 complete and 13747 interrupted iterations
default X [=====>-----] 012139/100000 VUs 05m41.0s/10m00.0s
ERROR[0664] thresholds on metrics 'http req failed' were crossed; at least one has abortOnFail enabled, stopping test prematurely
```

La primera imagen muestra el breakpoint test con "ramping-arrival-rate", donde la carga aumenta progresivamente y el sistema alcanza el punto de ruptura con 2076 VUs. La segunda imagen, usando solo "stages" (sin executor), lanza los 100000 VUs de golpe y el sistema soporta hasta 12139 VUs antes de superar el 1% de errores.

La diferencia principal es que "ramping-arrival-rate" simula un aumento gradual del tráfico, mientras que "stages" aplica la carga máxima de forma instantánea, lo que permite ver distintos comportamientos y límites del sistema.

Stress test

```
THRESHOLDS
http_req_duration
✓ 'avg<1000' avg=757.63ms

http_req_failed
✓ 'rate<0.01' rate=0.83%

TOTAL RESULTS

HTTP
http_req_duration.....: avg=757.63ms min=0s med=656.53ms max=40.56s p(90)=1.64s p(95)=1.94s
{ expected_response:true }.....: avg=763.99ms min=0s med=666ms max=40.56s p(90)=1.65s p(95)=1.94s
http_req_failed.....: 0.83% 19183 out of 2303699
http_reqs.....: 2303699 4704.375203/s

EXECUTION
iteration_duration.....: avg=1.18s min=0s med=729.62ms max=2m45s p(90)=1.71s p(95)=2.05s
iterations.....: 2297556 4691.830606/s
vus.....: 160 min=0 max=9711
vus_max.....: 9711 min=5883 max=9711

NETWORK
data_received.....: 647 MB 1.3 MB/s
data_sent.....: 178 MB 364 kB/s

running (8m09.7s), 0000/9711 VUs, 2297556 complete and 6143 interrupted iterations
default ✓ [=====] 0000/9711 VUs 8m0s
```

El stress test se ha superado correctamente: el sistema ha soportado una carga del 80% del punto de ruptura sin executor, que corresponde a 9711 VUs. No ha habido más de un 1% de peticiones fallidas y la duración media de las peticiones se ha mantenido por debajo de 1000ms, por lo que el sistema responde bien bajo condiciones de estrés sostenido.

Average load test

```
THRESHOLDS
http_req_failed
✓ 'rate<0.01' rate=0.16%

TOTAL RESULTS

HTTP
http_req_duration.....: avg=532.04ms min=0s med=478.66ms max=14.03s p(90)=1.01s p(95)=1.22s
{ expected_response:true }.....: avg=532.91ms min=0s med=479.27ms max=14.03s p(90)=1.01s p(95)=1.22s
http_req_failed.....: 0.16% 4413 out of 2686486
http_reqs.....: 2686486 5591.650904/s

EXECUTION
iteration_duration.....: avg=620.94ms min=0s med=552.52ms max=42.13s p(90)=1.06s p(95)=1.31s
iterations.....: 2686484 5591.646741/s
vus.....: 568 min=0 max=6069
vus_max.....: 6069 min=5908 max=6069

NETWORK
data_received.....: 760 MB 1.6 MB/s
data_sent.....: 209 MB 435 kB/s

running (8m00.4s), 0000/6069 VUs, 2686484 complete and 2 interrupted iterations
default ✓ [=====] 0000/6069 VUs 8m0s
```

El average load test se ha completado correctamente: el sistema ha soportado una carga del 50% del punto de ruptura sin executor, que corresponde a 6069 VUs. Las peticiones fallidas se han mantenido por debajo del 1%, por lo que el sistema responde bien bajo una carga promedio sostenida.

Spike test

```
THRESHOLDS
http_req_failed
✓ 'rate<=0.005' rate=0.18%

TOTAL RESULTS

HTTP
http_req_duration.....: avg=319.68ms min=0s med=309.81ms max=16.07s p(90)=580.71ms p(95)=675.39ms
{ expected_response:true }.....: avg=320.27ms min=0s med=310.2ms max=16.07s p(90)=581.03ms p(95)=675.77ms
http_req_failed.....: 0.18% 2401 out of 1292884
http_reqs.....: 1292884 5373.383611/s

EXECUTION
iteration_duration.....: avg=387.71ms min=0s med=348.22ms max=32.96s p(90)=626.84ms p(95)=741.12ms
iterations.....: 1292884 5373.383611/s
vus.....: 331 min=10 max=4855
vus_max.....: 4855 min=4855 max=4855

NETWORK
data_received.....: 365 MB 1.5 MB/s
data_sent.....: 101 MB 418 kB/s

running (4m00.6s), 0000/4855 VUs, 1292884 complete and 0 interrupted iterations
default ✓ [=====] 0000/4855 VUs 4m0s
```

El spike test se ha superado correctamente: el sistema ha sido capaz de gestionar una carga del 40% del punto de ruptura, que corresponde a 4855 VUs, en tan solo 2 minutos. Las peticiones fallidas se han mantenido por debajo del 0,5%, por lo que el sistema responde bien ante incrementos bruscos de carga.